

CLAIMS

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1. A modular switch, comprising:
a plurality of backplane sub-buses;
a plurality of cards which are each allocated one or more of the backplane sub-buses;
and
a controller which dynamically allocates the backplane sub-buses to the plurality of cards, based on the bandwidth needs of the cards.
- 10 2. A switch according to claim 1, wherein the bandwidth capacity of substantially all the backplane sub-buses is less than the sum of the maximal transmission bandwidth capacities of the cards.
- 15 3. A switch according to claim 1, wherein the controller is implemented by one of the cards.
4. A switch according to claim 3, wherein the controller is implemented by one of the cards which is selected dynamically.
- 20 5. A switch according to claim 1, wherein the cards transmit messages which indicate their bandwidth needs to the controller.
- 25 6. A switch according to claim 1, wherein each of the cards has a priority value which indicates its entitlement to bandwidth and the controller allocates the backplane sub-buses based on the priority values of the cards.
7. A switch according to claim 1, wherein substantially all the backplane sub-buses have the same bandwidth capacity.
- 30 8. A switch according to claim 1, wherein the plurality of backplane sub-buses comprise at least two sub-buses with different bandwidths.

9. A switch according to claim 1, wherein the controller confiscates one or more sub-buses from one or more of the cards when the one or more sub-buses are more needed by one or more other cards.

5 10. A switch according to claim 9, wherein the controller does not allocate a confiscated sub-bus to a card before it receives confirmation from the card from which the sub-bus was confiscated that the sub-bus was freed from its allocation.

10 11. A switch according to claim 1, wherein the controller calculates, for each of the cards, a bus demand value which represents the entitlement and need of the card to receive a sub-bus, and the controller allocates free sub-buses which are not allocated to the cards with the highest bus demand values.

15 12. A switch according to claim 11, wherein the controller confiscates sub-buses from cards whose bus demand value without the confiscated sub-buses is lower than the bus demand value of a different card after the confiscated sub-buses are transferred to it.

20 13. A modular switch, comprising:
a plurality of backplane sub-buses; and
a plurality of cards which are configurable to listen to a variable number of the backplane sub-buses.

25 14. A switch according to claim 13, wherein at least one of the plurality of cards listens to fewer than all the backplane sub-buses.

15. A switch according to claim 13, comprising a controller which dynamically changes the sub-buses to which each card listens.

30 16. A switch according to claim 13, wherein each of the cards is configured to listen to a respective group of peer cards.

17. A switch according to claim 16, wherein the sub-buses to which each of the plurality of cards listens are the sub-buses to which the respective group of peer cards transmit.

18. A switch according to claim 16, wherein each card listens to the cards which listen to it.

19. A switch according to claim 16, wherein at least one card listens to fewer than all the cards that listen to it.

20. A switch according to claim 16, wherein the peer group of one or more cards changes as a function of time.

21. A switch according to claim 20, wherein the peer groups are reduced in size during high security times.

22. A switch according to claim 13, comprising for at least one of the cards a filter which passes to the card only data from the sub-buses to which the card listens.

23. A method of allocating sub-buses to cards of a switch, comprising:
determining the bandwidth needs of each of the cards;
assigning each of the cards a bus demand value which is a function of the bandwidth needs of the card and the current bandwidth allocated to the card; and
allocating the sub-buses to the cards based on the bus demand values of the cards.

24. A method according to claim 23, wherein determining the bandwidth needs of the cards comprises receiving messages from the cards.

25. A method according to claim 23, wherein determining the bandwidth needs of a card comprises determining a measure of the utilization of the sub-buses currently allocated to the card.

26. A method according to claim 23, wherein determining the bandwidth needs of a card comprises listening to the sub-buses currently allocated to the card.

27. A method according to claim 23, wherein assigning each of the cards a bus demand value comprises assigning a bus demand value which is a function of the priority of the card.

28. A method according to claim 23, wherein assigning each of the cards a bus demand value comprises assigning a bus demand value which is a function of the minimal number of sub-buses which must be allocated to the card.

29. A method according to claim 23, wherein allocating the sub-buses to the cards comprises allocating sub-buses not currently allocated to a specific card as additional sub-buses to the cards with the highest bus demand values.

30. A method according to claim 23, wherein allocating the sub-buses to the cards comprises confiscating sub-buses from cards which have lower bus demand values without the confiscated sub-buses than the bus demand values of other cards with the confiscated sub-buses.

31. A modular switch, comprising:

a plurality of communication cards;

a plurality of backplane sub-buses which are used for communication between groups of the sub-buses; and

at least one controller which is configurable to divide the cards into different numbers of groups, such that the cards of the different groups do not transmit data to each other.

32. A switch according to claim 31, wherein the at least one controller is configurable to divide the cards into any number of groups between one and the number of cards.

33. A switch according to claim 31, wherein the at least one controller divides the cards into a number of groups configured by a user.

34. A switch according to claim 31, wherein the at least one controller divides the cards into a number of groups equal to the number of types of cards included in the plurality of cards.

35. A switch according to claim 31, wherein the cards of the different groups do not communicate with each other.

5 36. A switch according to claim 31, wherein the cards of the different groups do not communicate over any of the plurality of backplane sub-buses.

37. A switch according to claim 31, comprising a box having a plurality of slots in which the cards are located and wherein the cards of at least one group are not located in adjacent slots.

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38. A switch according to claim 31, wherein only one card writes to a sub-bus at any single time.